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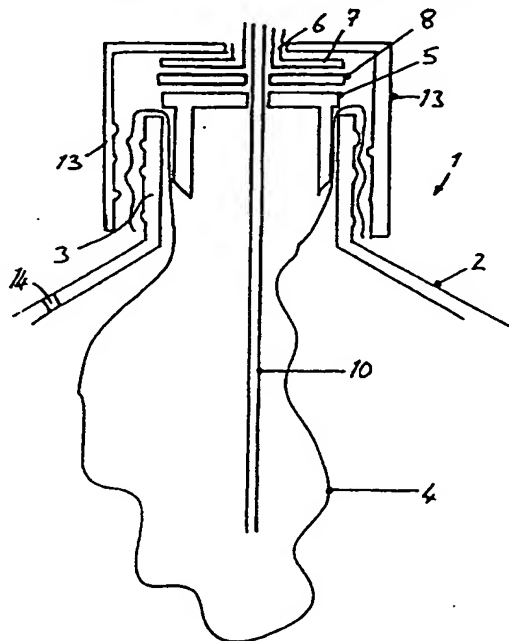
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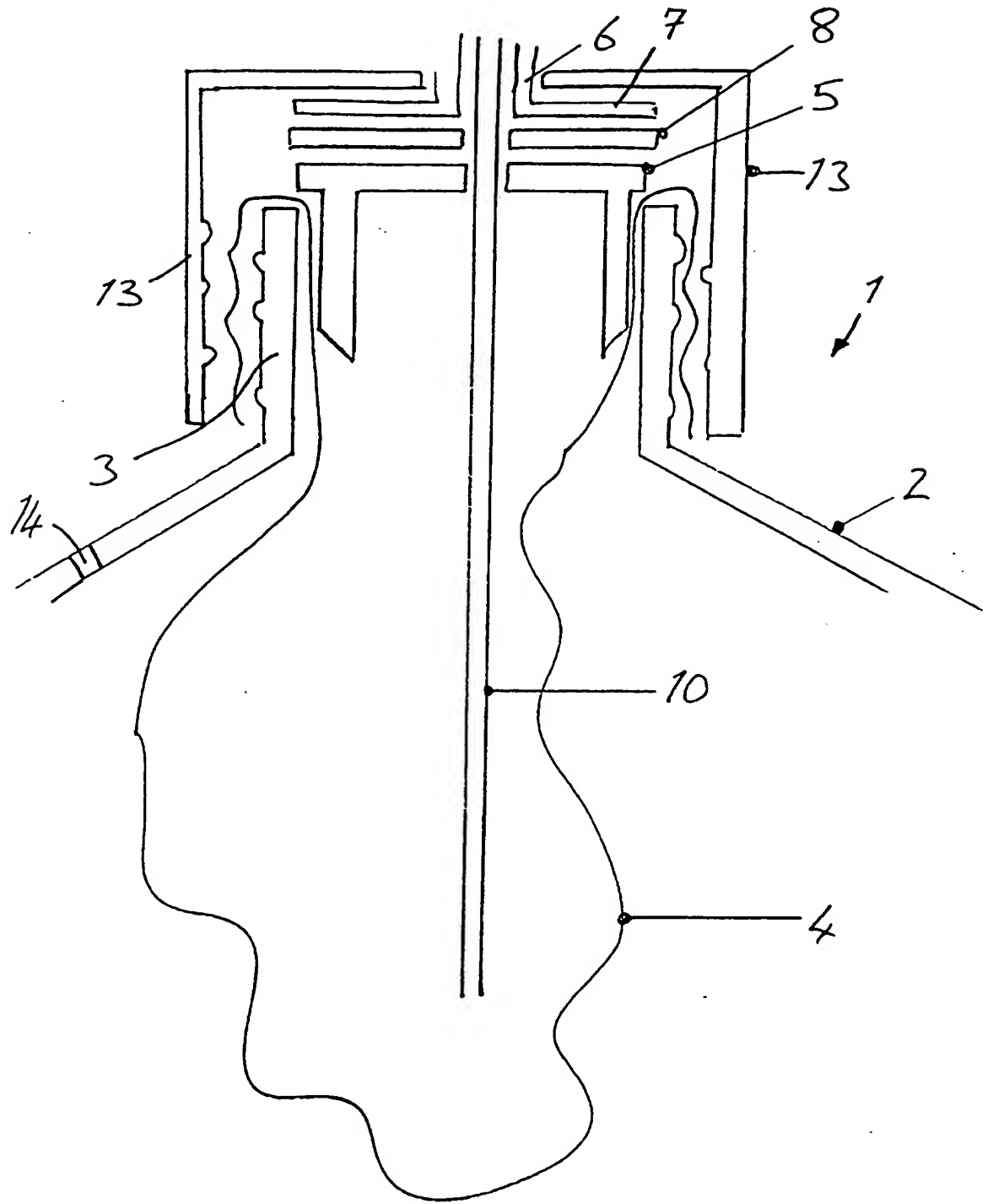
(54) Abstract Title

Spray dispenser with collapsible container

(57) The dispenser has a collapsible, liquid impermeable container 4, eg a bag or pouch, and an extraction arrangement, eg with a hand actuated trigger pump, for extracting liquid from the collapsible container 4 and dispensing the liquid as a spray. A seal is arranged to prevent air ingress into the collapsible container 4, the seal and extraction arrangement being such that the extraction arrangement is operable to dispense the liquid whilst the seal is in the sealing position. The collapsible container 4 collapses as liquid is dispensed, resulting in little or no back pressure (vacuum) existing in the flexible collapsing container; this inhibits ambient air being drawn into the collapsible container. The dispenser is thus suitable for spraying sterile or reactive fluids, eg in clean room environments such as hospitals, pharmaceutical or food preparation areas.



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Spray Dispenser

5 The present invention relates to a spray dispenser and in particular to spray dispensers suitable for use in spray dispensing sterile or reactive liquids.

10 Aerosol or spray dispensers are commonly used for dispensing sprayed sterile or reactive fluids in 'clean room' environments such as hospitals, pharmaceutical preparation areas and food preparation areas. Aerosol sprays are typically less prone to ingress of external contaminants into the aerosol container (because of the pressurised spray propellant). Manually actuatable extraction devices (such as hand pumped trigger devices) 15 are known to draw external air into the liquid container following actuation.

An improved spray dispenser has now been devised.

20 According to the invention, there is provided a spray dispenser comprising:

- i) a collapsible liquid impermeable container;
- 25 ii) extraction means for extracting liquid from the container and dispensing the liquid as a spray;
- iii) seal means arranged in a sealing position to substantially seal the collapsible container to substantially inhibit the ingress of air into 30 the collapsible container, the seal means and extraction means being arranged such that the extraction means is operable to dispense the liquid whilst the seal means is in the sealing position. 35

It is preferred that the collapsible container has a closed end and an open end, the extraction means acting to extract the liquid via the open end of the collapsible liquid impermeable container.

It is preferred that the dispenser further comprises support means for supporting the flexible liquid impermeable container. The support means preferably comprises an outer housing or container for the collapsible liquid impermeable container, which outer housing or container is preferably substantially more rigid than the collapsible liquid impermeable container. The support means preferably includes an opening or support neck for locating the seal means, and/or the extraction means. The opening/neck is preferably arranged to cooperate in sealing engagement with the seal means, preferably so as to seal the collapsible liquid impermeable container proximate the open end thereof.

The outer housing or container may comprise a vent permitting the air inside the housing/container (but externally) of the collapsible container to exist at ambient atmospheric pressure.

In one embodiment, the support means may comprise a bottle or the like (such as a plastics bottle), preferably having a neck opening for locating the seal means, and/or the extraction means.

In an alternative embodiment, the support means may comprise a frame structure, preferably having a support neck for locating the seal means, and/or the extraction means.

5 The seal means preferably comprises a seal element (such as a stopper, plug or bung) arranged to sealingly engage with the liquid impermeable container proximate the open end thereof so as to seal the collapsible liquid impermeable container. The seal element preferably comprises resiliently flexible material such as rubber or the like.

10 The seal element is preferably arranged to receive a dispensing line extending into the interior of the collapsible liquid impermeable container. The dispensing line (which may, typically be an elongate tube) preferably extends through the seal element being gripped in sealing engagement with a bore or aperture provided through the seal element. Alternatively, the dispensing line may be
15 bonded in the bore or aperture by a sealing adhesive.

20 The extraction means preferably comprises means for creating a differential pressure to dispense the liquid. The extraction means may comprise pumping means (typically actuatable by a trigger pumping mechanism) to dispense the liquid. The arrangement of the seal means and differential pressure extraction means ensures that any exhaust air or back pressure does not result in ambient
25 air being drawn into the collapsible container. This may be achieved by ensuring that any vent or back pressure release of the extraction means/pump trigger arrangement is positioned externally of the seal means. Because the collapsible container collapses as liquid is dispensed,
30 little or no back pressure (vacuum) exists in the flexible collapsing container.

35 The extraction means preferably further includes a nozzle for ensuring the liquid is dispensed as a spray.

The collapsible liquid impermeable container preferably comprises flexible sheet or membrane material. The collapsible liquid impermeable container preferably comprises a bag or pouch.

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The invention will now be further described in a specific embodiment, by way of example only, and with reference to the accompanying drawing which is a schematic sectional view of an exemplary spray dispenser according to the invention.

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Referring to the drawing, there is shown a spray dispenser 1 comprising an outer plastics bottle 2 having a neck 3 fitted with a screw threaded plastics cap 13. A collapsible liquid impermeable bag 4 is disposed in the interior of the bottle 2 such that an open end of the bag 4 is positioned in the neck 3 and has a portion folded around the neck 3 to lie against the external circumference of the neck 3.

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A rubber sealing bung 5 is a tight press fit in the bottle neck 3 sandwiching the collapsible bag 4 (proximate its open end) between the sealing bung 5 and the internal circumference of neck 3. A trigger assembly (the majority of which is not shown, but conforms to pump dispenser trigger assemblies known in the art) is mounted to the bottle neck 3. The trigger assembly includes a trigger neck 6 provided with a mounting flange 7 which sits over bung 5. A sealing washer 8 is sandwiched between the bung 5 and the mounting flange 7 of the trigger neck 6. Fitting screw cap 3 ensures that bung 5 is securely plugged in the bottle neck 3 (holding the collapsible bag securely), and that the mounting flange 7 of the trigger neck is held in firm ,sealing engagement with the bung 5, having the sealing washer 8 interposed therebetween.

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Bung 5 and sealing washer 8 are provided with axial apertures permitting a dip tube 10, connecting to the trigger assembly to pass into the interior of the collapsible bag 4. The resilient nature of the bung 5 ensures that an airtight seal is provided between the axial aperture of bung 5 and the dip tube 10. Alternatively, or additionally, the dip tube 10 may be thermally bonded to the axial aperture of bung 5, and/or a sealant material applied.

The trigger assembly conforms in general to known prior art differential pressure pump arrangements in which actuation of the trigger causes a pressure differential drawing liquid along the dip tube 10 and dispensing as a fine spray. The arrangement of the bung 5 and differential pressure extraction pump trigger arrangement ensures that any exhaust air or back pressure does not result in ambient air being drawn into the collapsible container. This is achieved by ensuring that any vent or back pressure release of the pump trigger arrangement is positioned externally of the seal means. Because the collapsible bag 4 collapses as liquid is dispensed, little or no back pressure (vacuum) exists in the flexible collapsing bag 4.

The plastics bottle 2 is provided with a vent 14 to atmosphere which prevents a partial vacuum being created between the interior walls of bottle 2 and the bag 4 as the bag collapses. Alternatively, the differential pressure created by the pump trigger arrangement may be sufficient to overcome any partial vacuum created in the interior of the bottle 2, externally of the collapsing bag 4.

Because of the extraction and seal arrangement, the spray

dispenser of the present invention enables a manually
actuatable differential pressure extraction arrangement
(such as a trigger pump dispenser) to be used for
applications requiring avoidance of atmospheric
contamination of the sprayed dispenser contents.

Claims:

1. A spray dispenser comprising:

- 5 i) a collapsible liquid impermeable container;
- ii) extraction means for extracting liquid from the
 container and dispensing the liquid as a spray;
- 10 iii) seal means arranged in a sealing position to
 substantially seal the collapsible container to
 substantially inhibit the ingress of air into
 the collapsible container, the seal means and
15 extraction means being arranged such that the
 extraction means is operable to dispense the
 liquid whilst the seal means is in the sealing
 position.
- 20 2. A spray dispenser according to claim 1, wherein the
 collapsible container has a closed end and an open
 end, the extraction means acting to extract the
 liquid via the open end of the collapsible liquid
 impermeable container.
- 25 3. A spray dispenser according to claim 1 or claim 2,
 further comprising support means for supporting the
 flexible liquid impermeable container.
- 30 4. A spray dispenser according to claim 3, wherein the
 support means comprises an outer housing or container
 for the collapsible liquid impermeable container.
- 35 5. A spray dispenser according to claim 4, wherein the
 outer housing or container is substantially more
 rigid than the collapsible liquid impermeable

container.

- 5 6. A spray dispenser according to any of claims 3 to 5,
 wherein the support means includes an opening or
 support neck for locating the seal means.
- 10 7. A spray dispenser according to any of claims 3 to 6,
 wherein the support means includes an opening or
 support neck for locating the extraction means.
- 15 8. A spray dispenser according to claim 6 or claim 7,
 wherein the opening/neck is configured to cooperate
 in sealing engagement with the seal means.
- 20 9. A spray dispenser according to claim 8, wherein
 opening/neck is configured to cooperate in sealing
 engagement with the seal means so as to seal the
 collapsible liquid impermeable container proximate
 the open end thereof.
- 25 10. A spray dispenser according to any of claims 4 to 9,
 wherein the outer housing or container includes a
 vent permitting the air inside the housing/container,
 but externally of the collapsible container, to exist
 at ambient atmospheric pressure.
- 30 11. A spray dispenser according to any of claims 3 to 10,
 wherein the support means comprises a bottle or the
 like.
12. A spray dispenser according to any of claims 3 to 10,
 wherein, the support means comprises a frame
 structure.

- 5 13. A spray dispenser according to any preceding claim,
 wherein the seal means comprises a seal element
 arranged to sealingly engage with the liquid
 impermeable container proximate the open end thereof
 so as to seal the collapsible liquid impermeable
 container.
- 10 14. A spray dispenser according to claim 13, wherein the
 seal element comprises a stopper, plug or bung.
- 15 15. A spray dispenser according to any preceding claim,
 wherein the seal element comprises resiliently
 flexible material such as rubber or the like.
- 20 16. A spray dispenser according to any preceding claim,
 wherein the extraction means includes a dispensing
 line extending into the interior of the collapsible
 liquid impermeable container.
17. A spray dispenser according to claim 16, wherein the
 dispensing line comprises an elongate tube.
- 25 18. A spray dispenser according to claim 16 or claim 17,
 wherein the dispensing line extends through the seal
 means being gripped in sealing engagement with a bore
 or aperture provided through the seal means.
- 30 19. A spray dispenser according to any preceding claim,
 wherein the extraction means includes means for
 creating a differential pressure to dispense the
 liquid from the interior of the collapsible
 container.
- 35 20. A spray dispenser according to claim 19, wherein the

extraction means comprises pump means arranged to dispense the liquid as a pumped spray.

- 5 21. A spray dispenser according to claim 20, wherein the pump means is actuatable by a trigger pumping arrangement.
- 10 22. A spray dispenser according to any preceding claim, wherein the container collapses from an expanded state to an increasingly collapsed state as the liquid is extracted from the container.
- 15 23. A spray dispenser according to any preceding claim, wherein the extraction means further includes a nozzle for ensuring the liquid is dispensed as a spray.
- 20 24. A spray dispenser according to any preceding claim, wherein the collapsible liquid impermeable container comprises flexible sheet or membrane material.
25. A spray dispenser according to any preceding claim, wherein the collapsible liquid impermeable container preferably comprises a bag or pouch.



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Claims searched: 1 to 25

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Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.Q): F1R (R15A); F1W (WCL)

Int CI (Ed.6): B05B 9/08, 11/00

Other: Online: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 622311 A2 (Shinko) - see eg column 1	1,21-25 at least
X	EP 582517 A2 (STEP)	1,21-25 at least
X	EP 447687 A1 (Procter & Gamble) - see eg column 4, lines 29-37	1,21-25 at least
X	US 5819986 (ITSAC) - see eg column 5, lines 21-40	1,21-25 at least
X	US 5139168 (L'oreal) - see eg column 4, lines 17-26	1,21-25 at least
X	US 5004123 (Stoody) - see eg column 1, lines 11-17	1,21-25 at least
X	US 4322020 (Stone)	1,21-25 at least

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
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P Document published on or after the declared priority date but before the filing date of this invention.
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